

## **Erosion Management Specialist**

Performance Task

### **Introduction**

Many beach communities are concerned about the erosion of their beaches. Erosion is the process of water or wind moving or breaking down rock, soil, or sand over time. Erosion is causing beaches to shrink or get smaller in some coastal communities. This is a concern because beach communities make a great deal of money from people using their beaches for fun and vacations. Keeping these beaches from eroding is important for the ecosystem and for the community. Weather patterns, storm surges, and heavy waves can all increase coastal erosion. These communities are looking for strategies to protect their beaches and to minimize erosion.

### **Teachers notes:**

This task meets the following Next Generation Science Standards:

#### **EARTH AND SPACE SCIENCE**

Earth's Systems - Students who demonstrate understanding can:

- (4-ESS2-1.) Make observations and/or measurements to provide evidence of the effects of weathering or the rate of erosion by water, ice, wind, or vegetation. Disciplinary Core Ideas Earth Materials and Systems
- (ESS2.A:1.) Rainfall helps to shape the land and affects the types of living things found in a region. Water, ice, wind, living organisms, and gravity break rocks, soils, and sediments into smaller particles and move them around. (4-ESS2-1)

Earth and Human Activity - Students who demonstrate understanding can:

- (4-ESS3-2.) Generate and compare multiple solutions to reduce the impacts of natural Earth processes on humans.

### **Big Idea / Essential Questions**

#### **Big Idea**

- Solid, liquid, and gaseous Earth materials all circulate in large scale systems at a variety of time scales, giving rise to landscapes, the rock cycle, ocean currents, weather and climate.

#### **Essential Questions**

- What causes the great variation at the Earth's surface?

#### **G.R.A.S.P.**

## Goal

Your goal is to create a plan to help protect a community's beaches from coastal erosion and flooding.

## Role

You are part of a team of Erosion Management Specialists working for a beach community. Your job is to help them understand the process of coastal erosion and how the community can help protect the beaches.

## Audience

Your audience is the community members and the local government. They want to learn how this natural process works and what causes it to happen faster or slower. The community needs to help protect the beaches and they are looking to your team to provide answers.

## Situation

Many beach communities are concerned about the erosion of their beaches. Erosion is the process of water or wind moving or breaking down rock, soil, or sand over time. Erosion is causing beaches to shrink or get smaller in some coastal communities. This is a concern because beach communities make a great deal of money from people using their beaches for fun and vacations. Keeping these beaches from eroding is important for the ecosystem and for the community. Weather patterns, storm surges, and heavy waves can all increase coastal erosion. These communities are looking for strategies to protect their beaches and to minimize erosion.

## Products

### 1. Demonstration

As part of your work you will give a demonstration on the process of coastal erosion. You need to show the effects that erosion and wave action have on our beaches. Your demonstration should include several factors that can cause erosion. You also should share one idea for *preventing* erosion. If you choose to videotape your demonstration, you may want to consider publishing it online or in another place where the community can watch it to understand erosion.

- How does the location of the community impact the process of coastal erosion?
- What can people do to help reduce the effects of erosion?
- How does the process of coastal erosion work?

### Demonstration - Erosion Management Specialist

Achievement Levels	1	2	3	4
Impact of Erosion (x1)	Student shows little understanding that solutions are needed to reduce the impact of erosion on a beach community.	Student shows some understanding that solutions are needed to reduce the impact of erosion on a beach community.	Student shows understanding that solutions are needed to reduce the impact of erosion on a beach community.	Student shows strong understanding that solutions are needed to reduce the impact of erosion on a beach community.

<b>Achievement Levels</b>	<b>1</b>	<b>2</b>	<b>3</b>	<b>4</b>
<b>Erosion Solutions</b> (x1)	The product does not quite present an idea that could prevent erosion.	The product somewhat presents an idea that could prevent erosion.	The product presents an a possible idea that could prevent erosion.	The product presents an important idea that could prevent erosion.
<b>The Process of Erosion</b> (x1)	The product demonstrates little understanding of the process of erosion and it's potential impact on Earth's materials.	The product demonstrates some understanding of the process of erosion and it's potential impact on Earth's materials.	The product demonstrates understanding of the process of erosion and it's potential impact on Earth's materials.	The product demonstrates understanding of the process of erosion and it's potential impact on Earth's materials.
<b>Demonstration</b> (x1)	The product does not present much of an explanation of erosion or any potential design solutions.	The product presents some explanation of erosion and potential design solutions and uses some important facts or details.	The product presents an explanation of erosion and potential design solutions in an organized way that uses important facts and details.	The product presents a detailed explanation of erosion and potential design solutions in an organized way that uses important facts and details.
<b>Delivery</b> (x1)	Presenter makes little eye contact, but needs to work on good posture and voice volume for a presentation.	Presenter makes some eye contact, may have adequate posture and voice volume throughout some of the presentation.	Presenter makes eye contact, has good posture and adequate volume throughout most of the presentation.	Presenter makes very good eye contact, has excellent posture and voice volume throughout the whole presentation.

## 2. Oral Presentation

You need to put together an oral presentation for the people who live in the beach community. This presentation should tell them about about erosion and how it can impact their coastal community. They are interested in your ideas on how to prevent erosion from happening to their beaches. Based upon your information, they will make a decision about how best to keep their beach from being eroded. Based upon the location of the community, you will want to discuss how weather can impact the rate of coastal erosion. The people of the community will appreciate hearing and seeing your demonstration because it will help them better understand the situation.

- What are the causes of beach erosion?
- How does the location of the community affect erosion?
- What things can the community do to help stop or reduce the erosion of the coast?

### Oral Presentation - Erosion Management Specialist

<b>Achievement Levels</b>	<b>1</b>	<b>2</b>	<b>3</b>	<b>4</b>
<b>The Process of Erosion</b> (x1)	The product demonstrates little understanding of the process of erosion and it's potential impact on Earth's materials	The product demonstrates some understanding of the process of erosion and it's potential impact on Earth's materials	The product demonstrates sufficient understanding of the process of erosion and it's potential impact on Earth's materials	The product demonstrates strong understanding of the process of erosion and it's potential impact on Earth's materials
<b>Impact of Erosion</b> (x1)	Student shows little understanding that solutions are needed to reduce the impact of the of erosion on a beach community.	Student shows some understanding that solutions are needed to reduce the impact of the of erosion on a beach community.	Student shows understanding that solutions are needed to reduce the impact of the of erosion on a beach community.	Student shows strong understanding that solutions are needed to reduce the impact of the of erosion on a beach community.
<b>Erosion Solutions</b> (x1)	The product presents very few strategies that could work to prevent erosion.	The product presents some strategies that could work to prevent erosion.	The product presents strategies that could work to prevent erosion.	The product expertly presents various effective strategies that could work to prevent erosion.
<b>Oral Presentation</b> (x1)	Presenter makes little eye contact, but needs to work on good posture and voice volume for a presentation.	Presenter makes some eye contact, may have adequate posture and voice volume throughout some of the presentation.	Presenter makes eye contact, has good posture and adequate volume throughout most of the presentation.	Presenter makes very good eye contact, has excellent posture and voice volume throughout the whole presentation.

Achievement Levels	1	2	3	4
<b>Research</b> (x1)	Product shows that little research was conducted around the topic.	Product shows that some research was conducted around the topic.	Product shows that research was conducted around the topic.	Product shows that thorough research was conducted around the topic.

### 3. Poster

As part of your work with this community you will make posters that can be displayed along the beach entrances. The purpose of these posters is to highlight different ways that the community can minimize erosion of the beaches. Hopefully these posters will be a good way to make people aware and encourage them to work together.

- What are the causes of coastal erosion?
- How does the location of the community effect erosion?
- What things can be done to help stop or reduce the erosion happening on the coast?

#### Poster - Erosion Management Specialist

Achievement Levels	1	2	3	4
<b>Erosion and Impact</b> (x1)	The product provides no evidence of the value of potential solutions to reduce the impact of the natural process of erosion on a beach community.	The product provides minimal evidence of the value of potential solutions to reduce the impact of the natural process of erosion on a beach community.	The product provides evidence with several potential solutions to reduce the impact of the natural process of erosion on a beach community.	The product provides strong evidence with several potential solutions to reduce the impact of the natural process of erosion on a beach community.
<b>Erosion and Solutions</b> (x1)	The product presents few idea for design solutions reflecting the wants and needs of the problem.	The product presents a few good ideas for design solutions reflecting the wants and needs of the problem.	The product presents some good ideas for design solutions reflecting the wants and needs of the problem.	The product presents important considerations for design solutions reflecting the wants and needs of the problem.
<b>The Process of Erosion</b> (x1)	The product demonstrates little understanding of the process of erosion and it's potential impact on Earth's materials	The product demonstrates some understanding of the process of erosion and it's potential impact on Earth's materials	The product demonstrates sufficient understanding of the process of erosion and it's potential impact on Earth's materials	The product demonstrates strong understanding of the process of erosion and it's potential impact on Earth's materials
<b>Poster Organization</b> (x1)	Poster is not very organized and does not use many design elements such as color, texture, or shape.	Poster is somewhat organized and uses some creative design elements of color, texture, and shape.	Poster is organized and uses creative design elements in the use of space, color, texture, and shape.	Poster is very organized and uses creative design elements such as space, color, texture, and shape.
<b>Poster Content</b> (x1)	Poster does not have the required elements, a title, or any information that would help support the purpose or make it interesting for the audience.	Poster contains some required elements, a title, but little information that is interesting or appropriate for the purpose and the audience.	Poster contains most required elements, a title, relevant information with appropriate purpose for the audience.	Poster contains all required elements, a clear title, relevant and accurate information that makes it very interesting for the audience.

### 4. Webpage

The community council has asked your group to develop a webpage that people can see. They want your webpage to explain the process of coastal erosion and how it impacts the local beaches. Based upon the location of the community, you will want to discuss how weather can impact the rate of coastal erosion. The webpage will need to provide information about strategies that can be used to minimize the impact of erosion on the beaches. The webpage should include pictures and multimedia to help readers understand your ideas.

- What is the process of coastal erosion and how does it impact local beaches?
- How can weather impact the rate of coastal erosion?
- How does the location of the community impact the process of coastal erosion?

## Webpage - Erosion Management Specialist

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<b>The Process of Erosion</b> (x1)	The product demonstrates little understanding of the process of erosion and it's potential impact on Earth's materials	The product demonstrates some understanding of the process of erosion and it's potential impact on Earth's materials	The product demonstrates sufficient understanding of the process of erosion and it's potential impact on Earth's materials	The product demonstrates strong understanding of the process of erosion and it's potential impact on Earth's materials
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<b>Erosion Solutions</b> (x1)	The product presents very few strategies that could work to prevent erosion.	The product presents some strategies that could work to prevent erosion.	The product presents strategies that could work to prevent erosion.	The product expertly presents various effective strategies that could work to prevent erosion.
<b>Weather and Erosion</b> (x1)	Product demonstrates little knowledge of how weather can cause or effect erosion.	Product demonstrates some knowledge of ways weather can cause or effect erosion.	Product demonstrates knowledge of ways weather can cause or effect erosion.	Product demonstrates excellent knowledge of ways weather can cause or effect erosion.
<b>Research</b> (x1)	Product shows that little research was conducted around the topic.	Product shows that some research was conducted around the topic.	Product shows that research was conducted around the topic.	Product shows that thorough research was conducted around the topic.
<b>Webpage</b> (x1)	The webpage design is unoriginal. Pictures used do not support the important information.	The webpage design is somewhat original. Few pictures are creatively used with the important information to get the reader interested.	The webpage design is mostly original. Pictures are creatively used with most important information to get the reader interested.	The webpage design is original. Pictures are creatively used with the important information to get the reader interested.
<b>Content and Mechanics</b> (x1)	The language of the webpage does not engage the audience with the information. The webpage has many errors in grammar or spelling.	The language of the webpage engages the audience with some of the information. The webpage has some errors in grammar or spelling.	The language of the webpage engages the reader with the information. The webpage has few errors in grammar or spelling.	The language of the webpage engages the reader with the information. The webpage has no errors in grammar or spelling.

## 5. Newspaper Article

You will write a newspaper article that talks about the strategies your group has come up with to reduce coastal erosion along the beaches. You will want to select two or three strategies and describe how they work. Based upon data from maps and patterns of Earth's features in the location of the community, you will want to discuss how weather can impact the rate of coastal erosion.

- How does coastal erosion work?
- How can you minimize coastal erosion around the beaches?
- How does the location of the community impact the process of coastal erosion?

## Newspaper Article - Erosion Management Specialist

Achievement Levels	1	2	3	4
<b>Writing Conventions</b> (x1)	The final product contains many errors of spelling, grammar or sentence structure. The article is poorly written.	The final product contains some errors of spelling, grammar or sentence structure. The article is written using a singular voice.	The final product contains minimal errors of spelling, grammar or sentence structure. The article is written using a singular voice.	The final product contains no errors of spelling, grammar or sentence structure. The article is written using a singular voice.
<b>Article Structure</b> (x1)	A headline is present and the article is a narrative that fairly describes the central idea.	A headline is present that captures the article's focus. The article is a narrative that describes the central idea.	A headline is present that captures the article's focus and is somewhat interesting for the audience. The article has an introduction, body and conclusion all generally focused around a central idea.	A headline is present that captures the article's focus as well as the audience's attention. The article has a strong introduction, body and conclusion all focused around a central idea.
<b>Detail Accuracy</b> (x1)	Some facts presented in the article are accurate and support the topic.	Most facts presented in the article are accurate and support the topic. Details present a summary of the topic.	Almost all facts presented in the article are accurate and strongly support the topic. Details are clear and present a summary of the topic.	All facts presented in the article are accurate and strongly support the topic. Details are clear and present an engaging summary of the topic.
<b>Impact of Erosion</b> (x1)	Student shows little understanding that solutions are needed to reduce the impact of the of erosion on a beach community.	Student shows some understanding that solutions are needed to reduce the impact of the of erosion on a beach community.	Student shows understanding that solutions are needed to reduce the impact of the of erosion on a beach community.	Student shows strong understanding that solutions are needed to reduce the impact of the of erosion on a beach community.
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